

ABSTRACT

A process for designing and manufacturing precision-folded, high strength, fatigue-resistant structures and a sheet therefore. The techniques include methods for precision bending of a sheet of material (41, 241, 341, 441, 541) along a bend line (45, 245, 345, 445, 543) and a sheet of material formed with bending strap-defining structures, such as slits or grooves (43, 243, 343, 443, 542), are disclosed. Methods include steps of designing and then separately forming longitudinally extending slits or grooves (43, 243, 343, 443, 542) through the sheet of material in axially spaced relation to produce precise bending of the sheet (41, 241, 341, 441, 541) when bent along the bend line (45, 245, 345, 445, 543). The bending straps have a configuration and orientation which increases their strength and fatigue resistance, and most preferably slits or arcs are used which causes edges (257, 457) to be engaged and supported on faces (255, 455) of the sheet material on opposite sides of the slits or arcs. The edge-to-face contact produces bending along a virtual fulcrum position in superimposed relation to the bend line (45, 245, 345, 445, 543). Several slit embodiments (43, 243, 343, 443, 542) suitable for producing edge-to-face engagement support and precise bending are disclosed, as is the use of the slit sheets to produce various three-dimensional structures and to enhance various design and fabrication techniques.